Crop residues management : a way to reduce mineral elements losses …and to save money

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• NOTION OF FERTILITY

Physical, chemical, biological factors — **CHARACTERISTICS OF THE ENVIRONMENT** (Climate - soil) X **FARMERS PRACTICES** — Human factors

→ **SOIL FERTILITY**

• WHAT IS EXPORTED WHEN HARVESTING?

Kg/ton of harvested dry seeds		N	P_2O_5	K_2O
Seed	maize	18 to 21	6 to 8	5 to 6
	upland rice	17	4	5
	Vigna	37	4	22
Straw	maize	8 to 17	4 to 5	10 to 20
	upland rice	20	3	27
	Vigna	65	5	71
Seed + straw	maize	26 to 38	10 to 13	15 to 26
	upland rice	37	7	32
	Vigna	102	9	93

Source : "Les grandes productions vegetales", SOLTNER, 1999
"Seja o doutor do seu arroz", FAGERIA et al., 1995

• HOW MUCH DO EXPORTATIONS COST?

Maize crop: Data corresponding to a yield of 4 tons of dry seeds/ha

Elements	N (kg)	P_2O_5 (kg)	K_2O (kg)
Seed	72	24	20
Straw	**32**	**20**	**40**
Seed + Straw	104	44	60

Mineral fertilization is supposed to balance mineral elements losses related to seeds exportation and straws burning. Burning cost is estimated to 50 USD/ha in term of fertilizer loss for a yield of 4 tons/ha. Calculated data do not consider restitution from burning (ashes production) and neither animal restitutions related to free grazing during the dry season and animal dejections.

• WHAT IS LOST WHEN BURNING CROP RESIDUES?

Mineral elements contained in cereal straws represent in average 2/5 of the total biomass produced above the soil for nitrogen and phosphorus, and more than 4/5 for potassium.

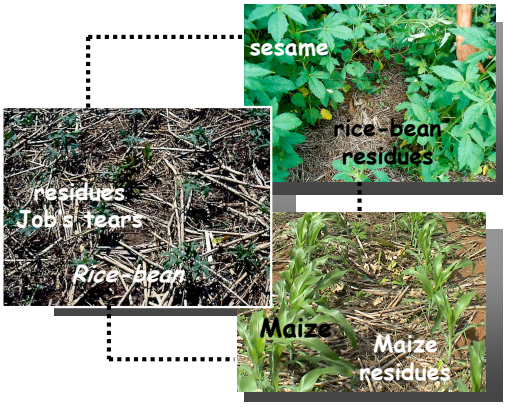

Residues of *V. umbellata*


Residues of Job's tears

• HOW TO MAINTAIN SOIL FERTILITY ?

• By creating a friendly environment for crops, integrating :
- improvement of soil biological life ;
- accumulations of organic matter in order to improve soil structure and mineral reserves ;
- reduction of soil erosion ;
- a better management of water resources.

• By providing nutritious elements for crops in order to maintain a positive mineral balance in the soil:
- to reduce nutritious elements losses (erosion, lixiviation) ;
- to optimize the providing of mineral and organic fertilizers.



• MANAGEMENT OF CROP RESIDUES THROUGH DIRECT SEEDING PRACTICES

In the South of Sayabouri province, Job's tears (*Coix lacryma* Jobi) and rice-bean (*Vigna umbellata*) are interesting former crops. Indeed biomasses of their residues are high, respectively 4 to 8 t DM/ha and 3 to 6 t DM/ha. Moreover, the degradation of these residues is relatively slow, due to a high rate of lignin in the straw allowing soil protection, reduction of both evaporation and weeds pressure.

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